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| (56) Documents cited | GB 2168392 A GB 1357740 A EP 0085933 A1 EP 0082456 A2 US 4447343 A US 4326965 A |
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(54) Fabric softener concentrate

(57) A concentrated fabric softener composition comprises at least 35% of a quaternary ammonium compound, suitably in a water miscible solvent. On addition of the concentrate to water for use, the viscosity of the composition increases.

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FABRIC SOFTENER COMPOSITION

This invention relates to a fabric softener composition.

It is well known to use fabric softener compositions in the laundering of textile material in order to improve the handle of the washed material. Conventional fabric softener compositions are usually based upon tallow substituted quaternary ammonium compounds or imidazoline compounds as active ingredient.

The preparation of these compositions requires very careful and gradual addition of the active ingredient to water that is maintained at an elevated temperature of the order of 55°C. In other words the conventional method of preparation is relatively slow and also requires heat energy. However, in addition to those disadvantages it is difficult to obtain a high concentration of active ingredient. This is a particularly serious drawback to conventional fabric softener compositions. High concentration fabric softener compositions can be packaged in smaller containers than the more dilute compositions. Not only does this save considerably on the packaging costs, but it also reduces the cost of transport and as well reduces the shelf space required for storage and for display at the point of sale. For the purchaser there is a less bulky container that needs to be carried home.

A considerable effort has, therefore, been made to produce fabric softener compositions with a higher concentration of active ingredient. While there has been some success in that field the concentrated compositions are generally very watery if they are diluted by the user. This watery physical appearance of the diluted composition is perceived by the user as an indication that the composition is not very effective. The received wisdom of the users of fabric softeners is that the effectiveness of a softener composition is related to its viscosity in that the less viscous the composition the less effective it will be. Although this is not necessarily true it represents a severe marketing difficulty. The normal recommendation for use of concentrated fabric softeners is, therefore, not to dilute them, but just to use a smaller dose than would be used with a regular strength product.

The present invention has been made with a view to dealing with these problems.

According to the invention there is provided a concentrated fabric softener composition preferably for dilution before use comprising at least 35% by weight of active ingredient, said active ingredient comprising a quaternary ammonium compound.

The quaternary ammonium compounds for use in the present invention include conventional compounds such as

di-alkyl di-methyl ammonium chloride, imidazoline quaternary ammonium compounds and diamido alkoxyolated quaternary ammonium compounds.

In a preferred embodiment of the concentrate the active ingredient is present in an amount not less than 40% by weight. Preferred active ingredients include alkyl or alkenyl substituted imidazoline quaternary ammonium compounds.

The concentrate preferably also includes a water miscible solvent for the active ingredient. Preferred solvents include alcohols particularly glycols.

The concentrate can be made by combining the constituents in any order and without heating. They are, therefore, very much easier and cheaper to produce than the known compositions.

The invention also provides a fabric softener composition comprising a concentrate diluted with water, said concentrate being as defined above. The preferred dilution is in the range from 1:1 to 1:20 parts by volume of concentrate to diluent and more preferably in the range 1:5 to 1:15.

The concentrates may also include additives such as dye, perfume, preservatives and the like.

The fabric softener concentrates are relatively low viscosity liquids which are transparent at ambient temperatures. Surprisingly when diluted with water prior to use the viscosity increases substantially. This totally unexpected consequence of dilution means that the perceived disadvantage of the watery appearance of diluted prior art concentrates is disposed of.

The rise in viscosity from concentrate to diluted product may be explained by the structuring of the liquid on transition from a predominantly organic solvent based system to an aqueous system.

In the former case the cationic active is in true solution whereas in the latter case it is in the form of dispersed multi-layered vesicles. These structures can clearly be seen using a microscope on high magnification (of the order of x 1000). In the case of oleic acid based imidazoline quaternary ammonium compounds which are liquid at room temperature at 75% active they even form when the raw material is mixed with cold water with vigorous shaking by hand. Previous fabric softener formulations have necessitated careful temperature control and carefully controlled mixing conditions in order to obtain the desired liquid structure with a satisfactory particle size distribution.

The careful control of these manufacturing variables is unnecessary with the invention because the structuring takes place on dilution of the product by the consumer. Simple mixing and shaking with cold water is all that is needed.

The product being isotropic is transparent or almost transparent. If that is not wanted a pearlising agent may be included which renders the product non-transparent and gives it a pearly sheen.

It would seem that that particle size affects viscosity and stability. If there are a significant proportion of particles greater than around 20 microns in diameter then this can give rise to instability (viscosity rise and even gelling). For good stability, the distribution needs to be fairly narrow and preferably the median needs to be under 10 microns. It also seems to be the case that if particles are too large (ie $>20\mu\text{m}$) they do not soften as well as smaller ones. However, we have found that the particle size distribution of the diluted product of the invention is similar to that of regular strength prior art compositions and that no particle size related problems arise.

The following Example further illustrates the invention.

EXAMPLE

A concentrated fabric softener was formulated as follows:-

% by weight

| | |
|--------------------|-------|
| Water | 15.00 |
| Hexylene glycol | 15.00 |
| * "Rewoquat" W3690 | 67.00 |
| Perfume | 3.00 |

* "Rewoquat" is a commercially available oleic acid derived imidazoline quaternary ammonium compound, 75% active in isopropyl alcohol (IPA) or dipropylene glycol (DPG).

The concentrate was produced by dispersing dye in the water, adding the hexylene glycol with stirring and subsequently the "Rewoquat" also with stirring. No heat was applied. Stirring was continued until the mixture was clear whereupon the perfume was added.

The viscosity of the product (Brookfield RVT Spindle 3, 50 rpm at 25°C) was 60-70 cp when the "Rewoquat" used was in IPA and 120 cp when the "Rewoquat" was DPG based.

For use 1 part of the concentrate was diluted with 9 parts of water. The viscosity was from 200 to 300 cp.

Both concentrate and diluted product were found to be stable at room temperature and at 37° for four months.

The softening performance of the diluted product was evaluated using the following protocol:

A number of loads of washing consisting of two cotton hand towels together with other fabric items such as polyester/cotton blend sheets and pyjamas, woollen/nylon jumpers and nylon underwear were assembled. Each load weighed about 2.5 Kg. The loads were washed in front loading automatic washing machines using a standard detergent powder. Diluted fabric softener of the invention was added to one or more loads, prior art fabric softener composition added to other loads and some loads were washed without fabric softener. The towels were air dried on a washing line.

The towels were evaluated for softness by a panel of judges who applied a rating based on a scale of from 1 (very harsh) to 10 (very soft).

The results were as follows:-

| Regular Strength | | |
|--------------------------|--------------------|----------------|
| <u>Control</u> | <u>Prior art</u> | Diluted |
| | <u>Composition</u> | <u>Product</u> |
| 3.88 | 7.33 | 7.58 |
| Significance level <0.1% | | |

There was statistically no significant difference in the softening performance of regular strength prior art composition and diluted product of the invention at equal dosage (90g).

With this protocol a score above 7 represents a premium quality fabric softener.

The invention is not restricted to the above-described embodiment and many variations and modifications can be made.

CLAIMS

1. A concentrated fabric softener composition comprising at least 35% by weight of active ingredient, said active ingredient comprising a quaternary ammonium compound.
2. A concentrated fabric softener composition as claimed in Claim 1 wherein the active ingredient is present in an amount of at least 40% by weight.
3. A concentrated fabric softener composition as claimed in any preceding claim, wherein the active ingredient comprises di-alkyl di-methyl ammonium chloride, diamido alkoxylated quaternary ammonium compounds, imidazoline quaternary ammonium compounds or mixtures thereof.
4. A concentrated fabric softener composition as claimed in Claim 3, wherein the active ingredient comprises an alkyl or alkenyl substituted imidazoline quaternary ammonium compound.
5. A concentrated fabric softener composition as claimed in any preceding claim, wherein the composition further comprises a water miscible solvent for the active ingredient.

6. A concentrated fabric softener composition as claimed in Claim 5, wherein the solvent is an alcohol, preferably a glycol.
7. A concentrated fabric softener composition as claimed in any preceding claim, wherein the ingredients are combined together in any order and without the application of heat.
8. A fabric softener composition comprising a concentrated fabric softener composition as claimed in any preceding claim diluted with water.
9. A fabric softener composition as claimed in Claim 8, wherein the dilution is in the range 1:1 to 1:20 parts by volume of concentrated fabric softener composition to diluent preferably 1:5 to 1:15.
10. A fabric softener composition as claimed in Claim 8 or Claim 9, wherein the viscosity of said composition is greater than the viscosity of the concentrated composition prior to dilution.

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Patents Act 1977
Examiner's report to the Comptroller under
Section 17 (The Search Report)

Application number

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Relevant Technical fields

(i) UK CI (Edition L) D1P PDCA PDCB PDP PDX PFD PP

(ii) Int CI (Edition 5) D06M

Search Examiner

P N DAVEY

Databases (see over)

(i) UK Patent Office

(ii) ONLINE DATABASES: WPI

Date of Search

25 JANUARY 1993

Documents considered relevant following a search in respect of claims 1-10

| Category (see over) | Identity of document and relevant passages | Relevant to claim(s) |
|--------------------------------|---|---------------------------------|
| X | GB 2168392 A (COLEGATE-PALMOLIVE) see eg Claim 2 and tables 1, 2 | 1-9 |
| X | GB 1357740 (CALGON) see eg Claim 6 and Example 3 | 1-7 |
| X | EP 0085933 A1 (HOECHST) see eg Claim 1 and Examples 2, 4 | 1-9 |
| X | EP 0082456 A2 (HOECHST) see eg Claim 1 and Examples 1 to 7 | 1-8 |
| X | US 4447343 (HOECHST) see eg Claim 2 and Examples 5 | 1-8 |
| X | US 4326965 (LEVERS) see eg Claim 4 and Examples 1, 2, 4, 7 to 9, 11, 12, 15 to 17 | 1-8 |

| Category | Identity of document and relevant passages | Relevant to claim(s.) |
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Categories of documents

X: Document indicating lack of novelty or of inventive step.

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A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

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